CASIO®

Service Manual

(with price)

CTK-500

CTK-500

ELECTRONIC KEYBOARD

INDEX

CONTENTS

Specifications 1

Block Diagram 2

Circuit Description 3

Major Waveforms 7

PCB Views and Major Check Points 8

Schematic Diagrams 9

Troubleshooting 11

IC and Transistor Lead Identification 12

Exploded View 14

Parts List 15

SPECIFICATIONS

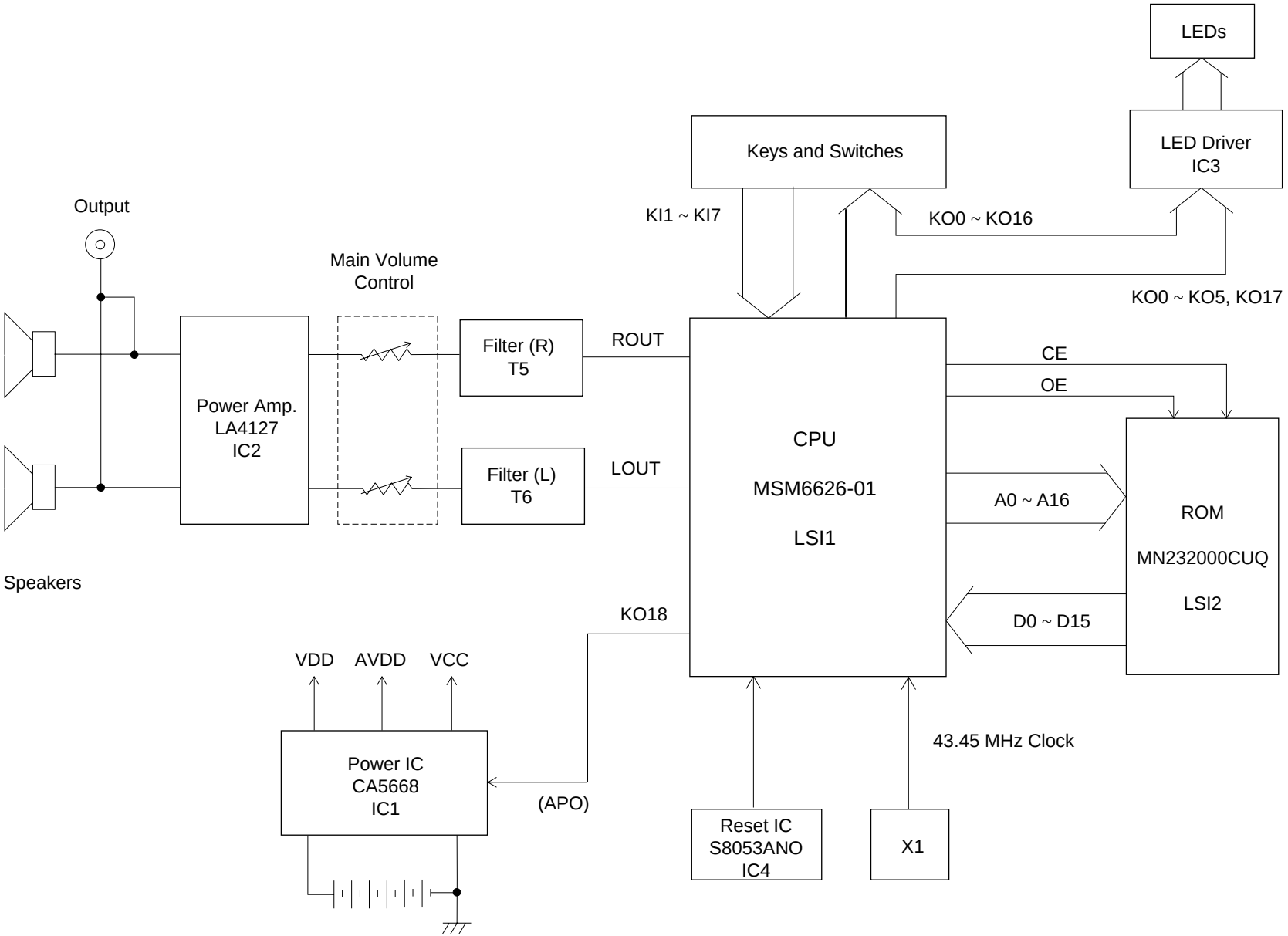
General

Number of Keys:	61
Polyphonic:	16-note
Preset Tones:	120
Auto-Rhythms:	40
Auto-Accompaniment:	CASIO Chord/Fingered
Jukebox Tunes:	40
Chord Memory:	Real-Time Recording Memory Capacity: 128 chords (maximum)
Built-In Speakers:	12 cm dia. 1.1W Input Rating: 2 pcs.
Terminals:	Output Jack [Output Impedance: 50 Ω, Output Voltage: 1.4 V (rms)MAX], AC Adapter Jack (DC 9 V)
Auto Power Off:	Approximately 6 minutes after the last operation
Power Source:	2-way AC or DC source AC: AC adapter DC: 6 D size dry batteries
Power Consumption:	6.7 W
Dimentions:	110 x 939 x 337 mm (HWD) (4-5/16 x 36-15/16 x 13-1/4 inches) (HWD)
Weight:	4.5 kg (9.9 lbs) excluding batteries

Electrical

Current Drain with 9V DC:	
No Sound Output	125 mA ± 30%
Maximum Volume with keys C4 to D#5 pressed in Clarinet tone, Volume; Maximum, Rhythm; Samba, Tempo; Maximum	530 mA ± 30%
Output Level (Vrms with 8 Ω load each channel): with key C4 pressed in Clarinet tone, Volume; Maximum	107 mV ± 30%
Sound Pressure Level: at 10 cm away from the speaker with key G6 in Brass-1 tone	107 dB ± 10 dB
Minimum Operating Voltage:	6.0 V

BLOCK DIAGRAM

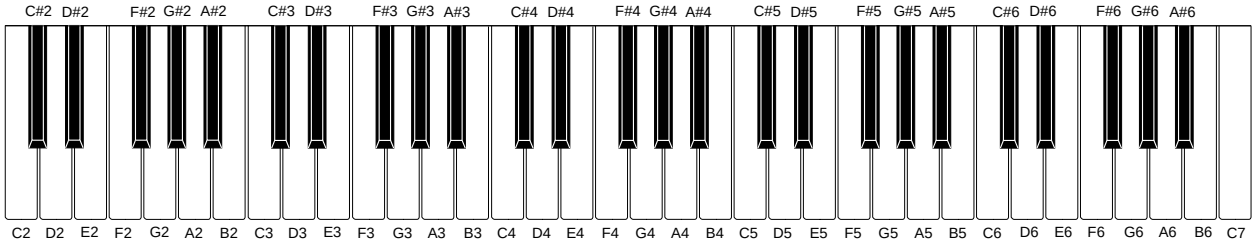


CIRCUIT DESCRIPTION

Key and Switch Matrix

	KI0	KI1	KI2	KI3	KI4	KI5	KI6	KI7
KO0	C2	C#2	D2	D#2	E2	F2		
KO1	F#2	G2	G#2	A2	A#2	B2		
KO2	C3	C#3	D3	D#3	E3	F3		
KO3	F#3	G3	G#3	A3	A#3	B3		
KO4	C4	C#4	D4	D#4	E4	F4		
KO5	F#4	G4	G#4	A4	A#4	B4		
KO6	C5	C#5	D5	D#5	E5	F5		
KO7	F#5	G5	G#5	A5	A#5	B5		
KO8	C6	C#6	D6	D#6	E6	F6		
KO9	F#6	G6	G#6	A6	A#6	B6		
KO10	C7				Tempo Up	Tempo Down		
KO11	Power Off	Normal	Fingered	CASIO Chord				
KO12	Accomp. Volume 1 (Min)	Accomp. Volume 2	Accomp. Volume 3	Accomp. Volume 4	Accomp. Volume 5 (Max)			
KO13	Reverb Off	Reverb 1	Reverb 2					
KO14	Synchro / Fill-In	Start/Stop	Intro/ Ending	Chord Memory Record	Chord Memory Play	Ad-Lib Musician	Jukebox Start/Stop	Beat (Jukebox)
KO15	Bank A	Bank B	Bank C	Bank D	Bank E	Bank F	Bank G	Bank H
KO16	Number 1	Number 2	Number 3	Number 4	Number 5	Solo Sound	Duo Sound	Ensenble Sound

Nomenclature of Keys



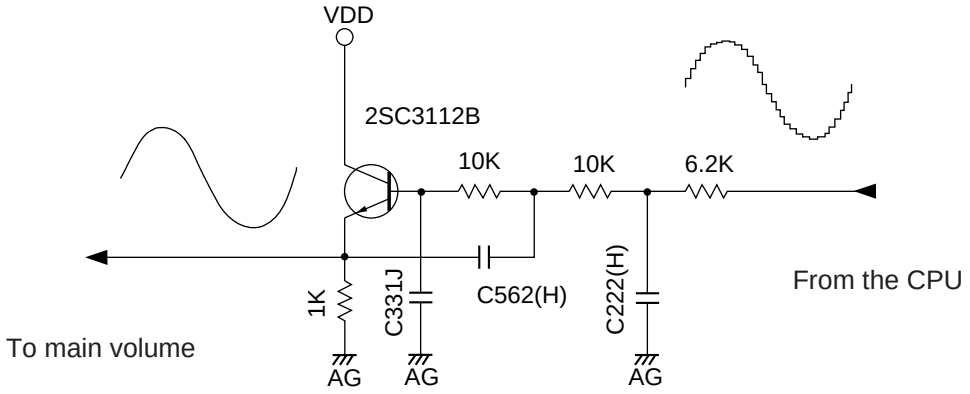
CPU (LSI1: MSM6626-01)

The CPU reads sound data from the ROM in accordance with the pressed key and the selected tone; the CPU can read rhythm data simultaneously when a rhythm pattern is selected. Then it provides the left and the right channels' waveforms separately, by converting the data into the waveforms with two built-in DACs. The CPU also controls keys, switches, and LEDs.
The following table shows the pin functions of LSI1.

Pin No.	Terminal	In/Out	Function
1 ~ 10 74 ~ 80	KO0 ~ KO16	Out	Using time sharing, the terminals provide key and switch scan signals, and LED drive signals.
11	KO17	Out	Clock output for the LED driver
12	KO18 (APO)	Out	APO (Auto Power Off) signal output.
13	KO20	Out	Not used.
14 ~ 21	KI0 ~ KI7	In	Input terminals from the keys and switches
22	-MI	In	Power ON trigger pulse input.
23	-RESET	In	CPU reset signal input.
24	REFH	In	Low level reference voltage input for the built-in DAC
25	AVDD	In	+5 V source for the built-in DAC
26	ROUT	Out	Right channel sound signal output
27	LOUT	Out	Left channel sound signal output
28	AGND	In	Ground (0 V) source for the built-in DAC
29	REFL	In	High level reference voltage for the built-in DAC
30, 31	TEST1, TEST2	——	Not used. Connected to ground.
32	GND	In	Ground (0 V) source
33, 34	COSI, COSO	In/Out	43.45 MHz clock input/output
35	VDD	In	+5 V DC source. Regardless of the power switch position, the terminal always receives +5 V DC.
36	-CE	Out	Chip enable signal output. Low effective.
37	-OE	Out	Read enable signal output. Low effective.
38 ~ 40	ADR17 ~ ADR19	Out	Not used.
41 ~ 57	ADR0 ~ ADR16	Out	Address bus for the ROM
58 ~ 73	DIN0 ~ DIN15	In	Data bus for the ROM

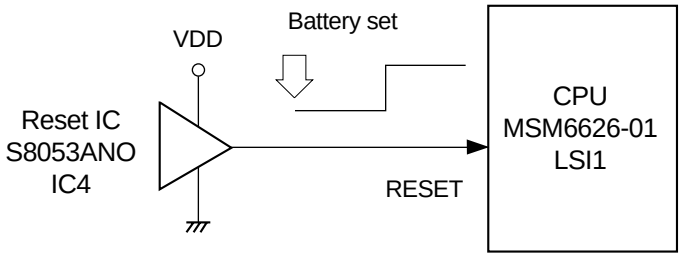
FIlter Block

Since the sound signall from the CPU is a stepped waveform, the filter block is added to smooth the waveform.



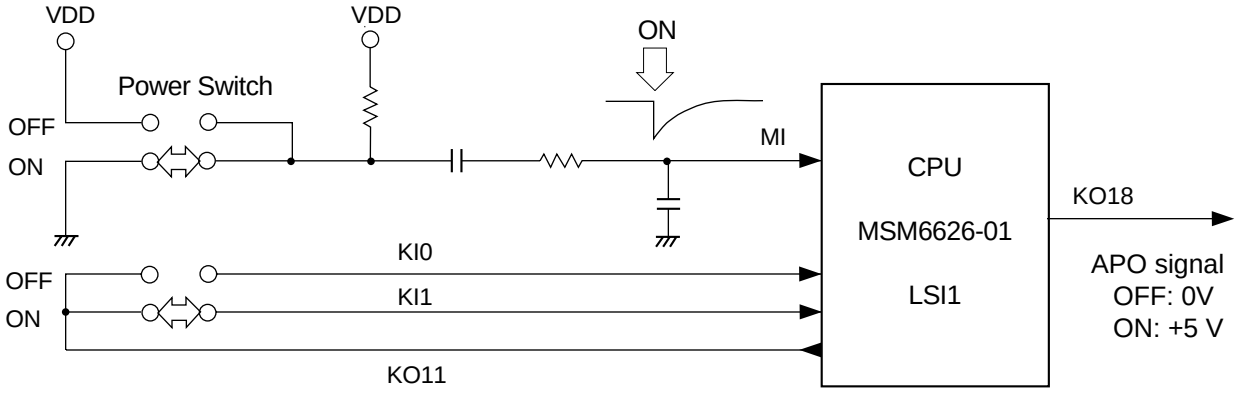
Initial Reset Circuit

When batteries are set or an AC adapter is connected, the reset IC provides a low pulse to the CPU. The CPU then initializes its internal circuit.



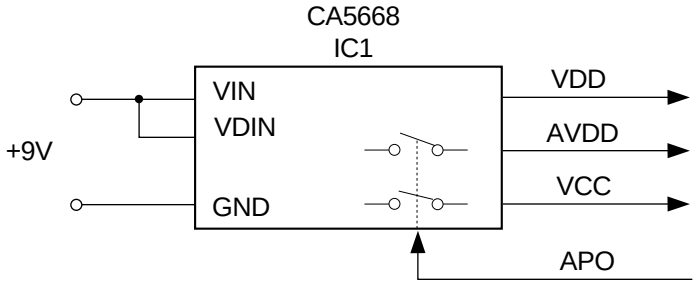
Power On/Off Circuit

When the power switch is turned on, a low level differential pulse is provided to terminal MI of the CPU. Upon receipt of the pulse, the CPU starts the power ON sequence and raises the APO signal to +5 V. When the switch is off, on receiving the KO11 signal at terminal KI0, the CPU drops the APO signal to ground level to shut down power.



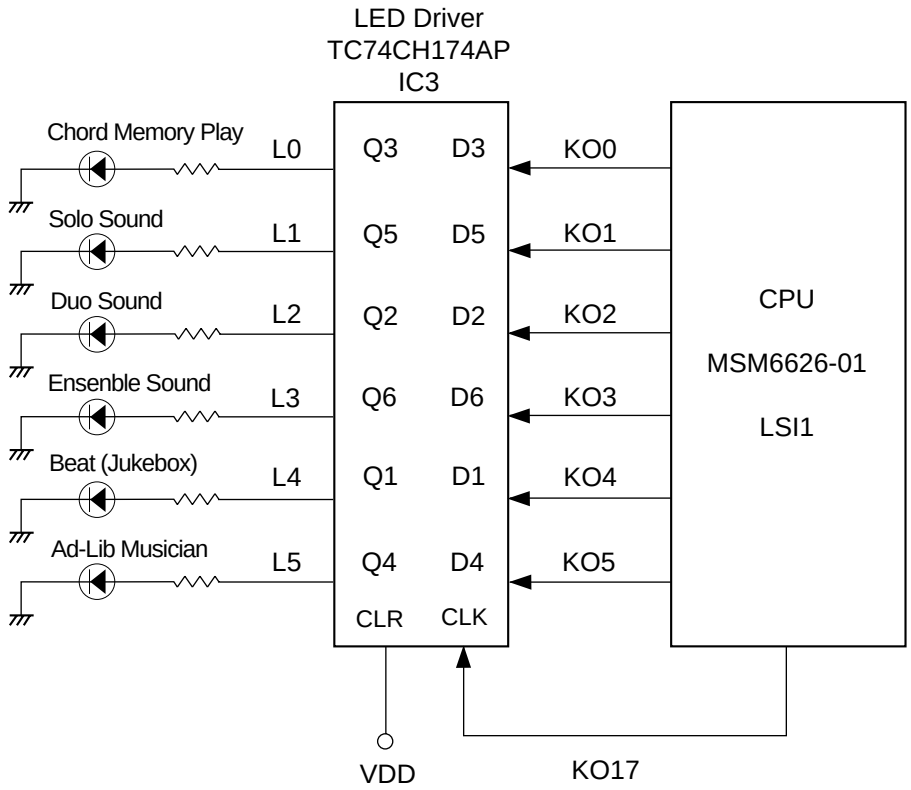
Power IC (IC1: CA5668)

The power IC generates three voltages—AVDD (+5 V) for the CPU and the reset IC, AVDD (+5 V) for the analog circuit, and VCC (+9 V) for the power amplifier. VDD (+5 V) is always generated, but AVDD (+5 V) and VCC (+ 9V) are controlled by the APO signal.

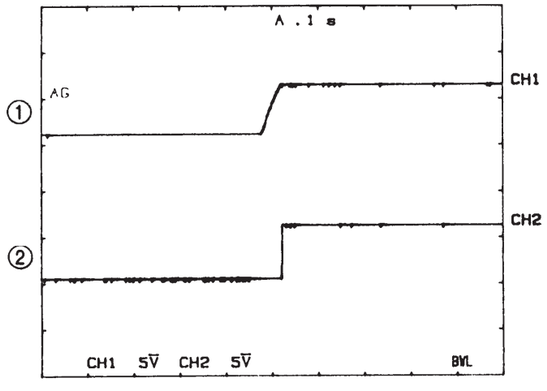


APO	VDD	AVDD	VCC
0 V	+5 V	0 V	0 V
+5 V	+5 V	+5 V	+9 V

LED Driving

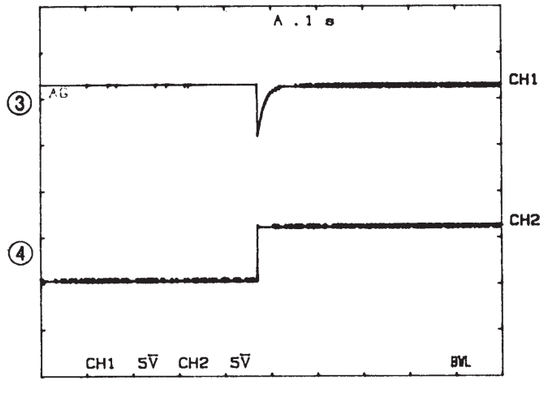


MAJOR WAVEFORMS



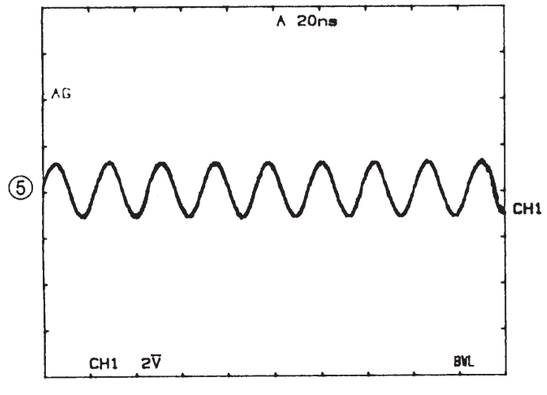
① VDD voltage
CA5668 pin 8

② Signal RESET
MSM6626-01 pin 23

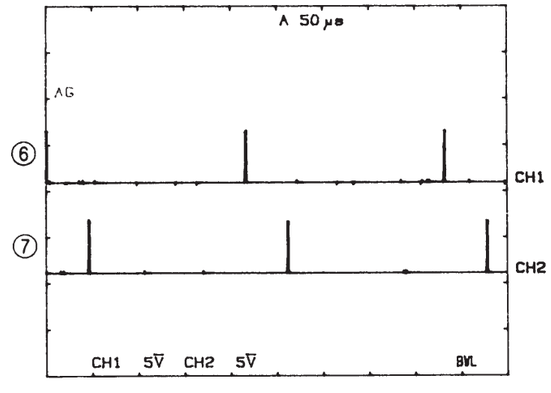


③ Power-ON trigger MI
MSM6626-01 pin 22

④ Signal APO
CA5668 pin 10

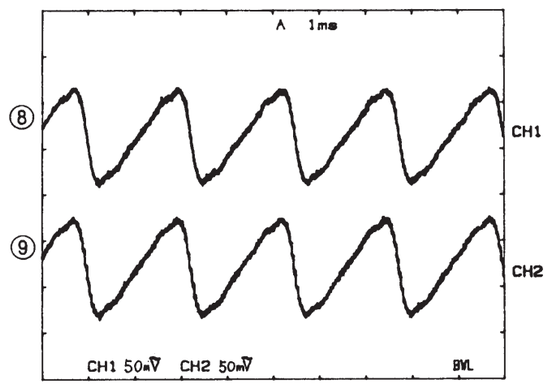


⑤ Clock pulse
MSM6626-01 pin 34



⑥ Key/Switch scan signal KO0
MSM6626-01 pin 74

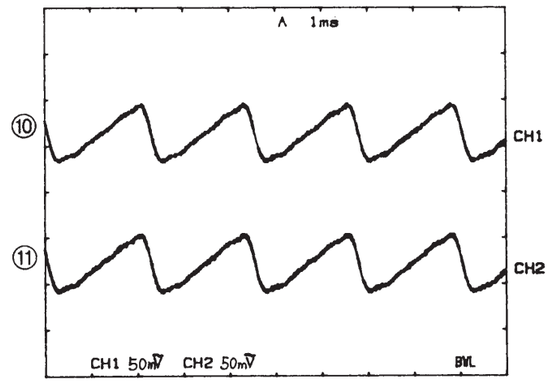
⑦ Key/Switch scan signal KO7
MSM6626-01 pin 1



⑧ Sound signal ROUT
MSM6626-01 pin 26

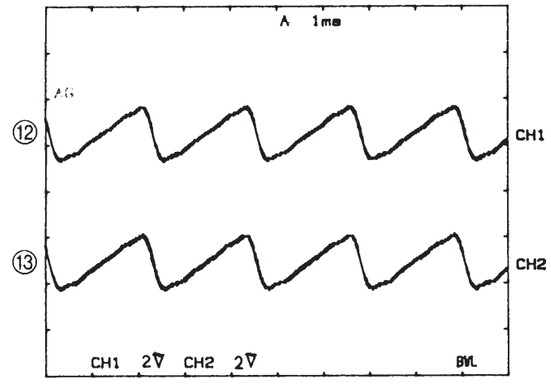
⑨ Sound signal LOUT
MSM6626-01 pin 27

Tone : Flute (No.F1)
Key : A4
Reverb : Off



⑩ Power amp. input
LA4127 pin 6

⑪ Power amp. input
LA4127 pin 15



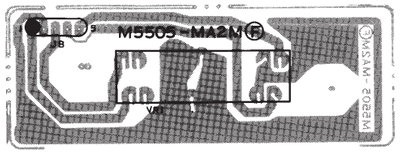
⑫ Power amp. output
LA4127 pin 9

⑬ Power amp. output
LA4127 pin 12

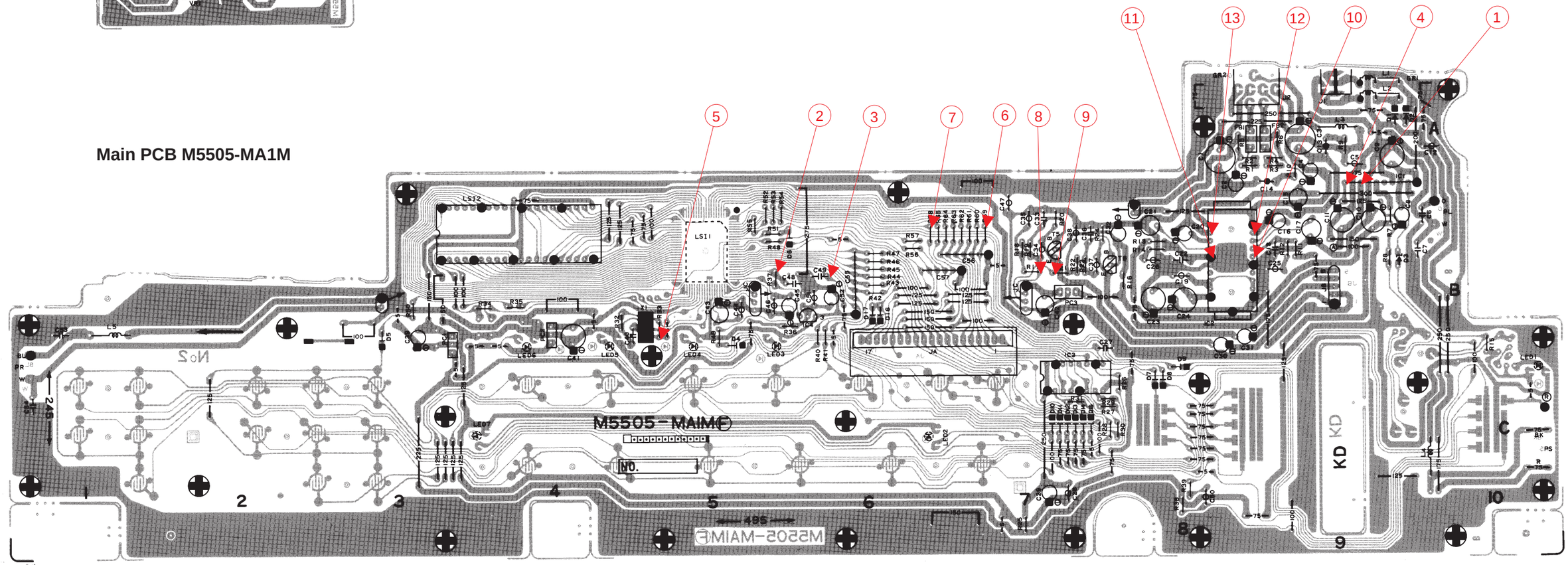
Tone : Flute (No.F1)
Key : A4
Reverb : Off
Volume : Maximum

PCB VIEWS AND MAJOR CHECK POINTS

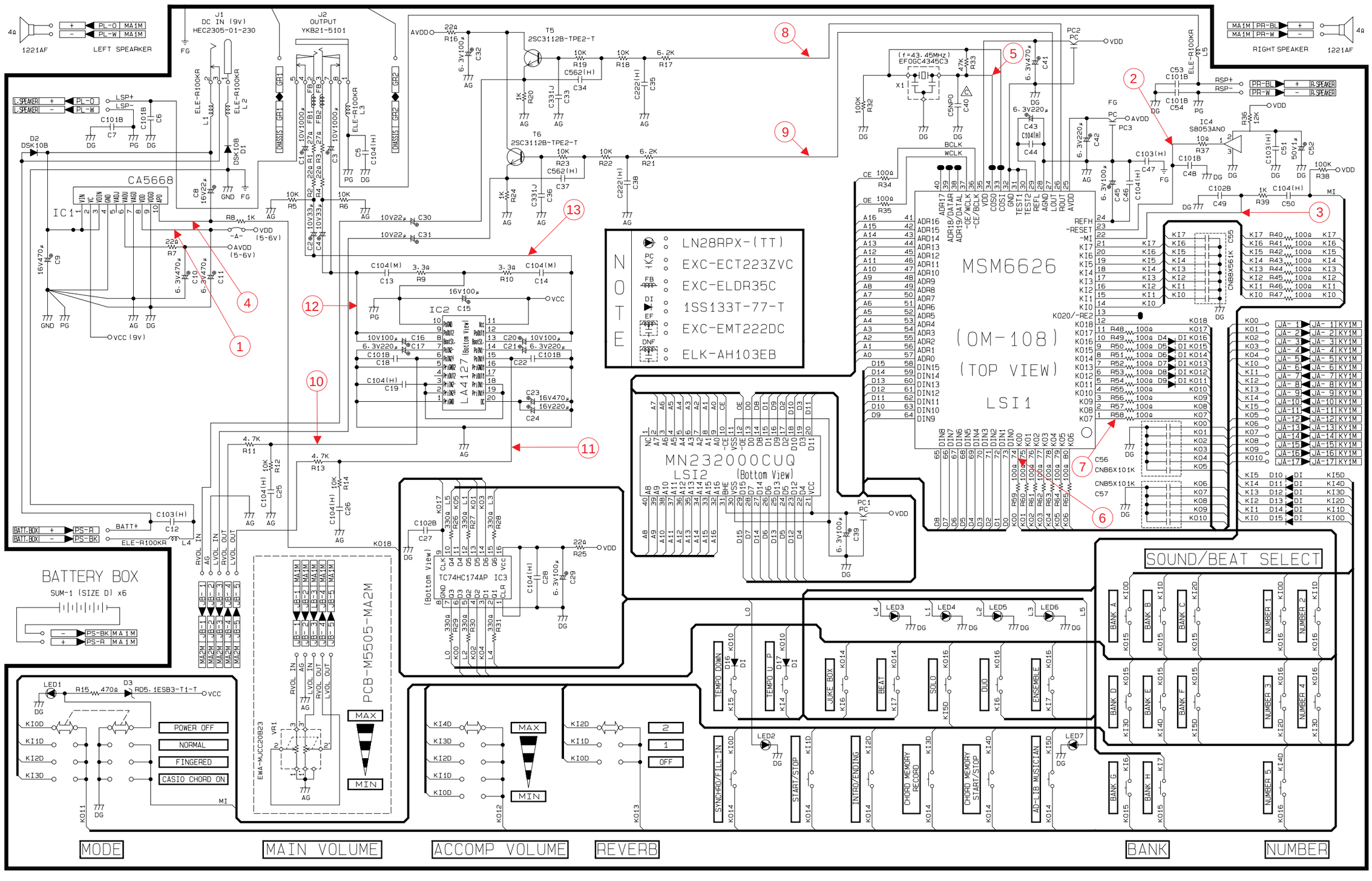
Volume PCB M5505-MA2M



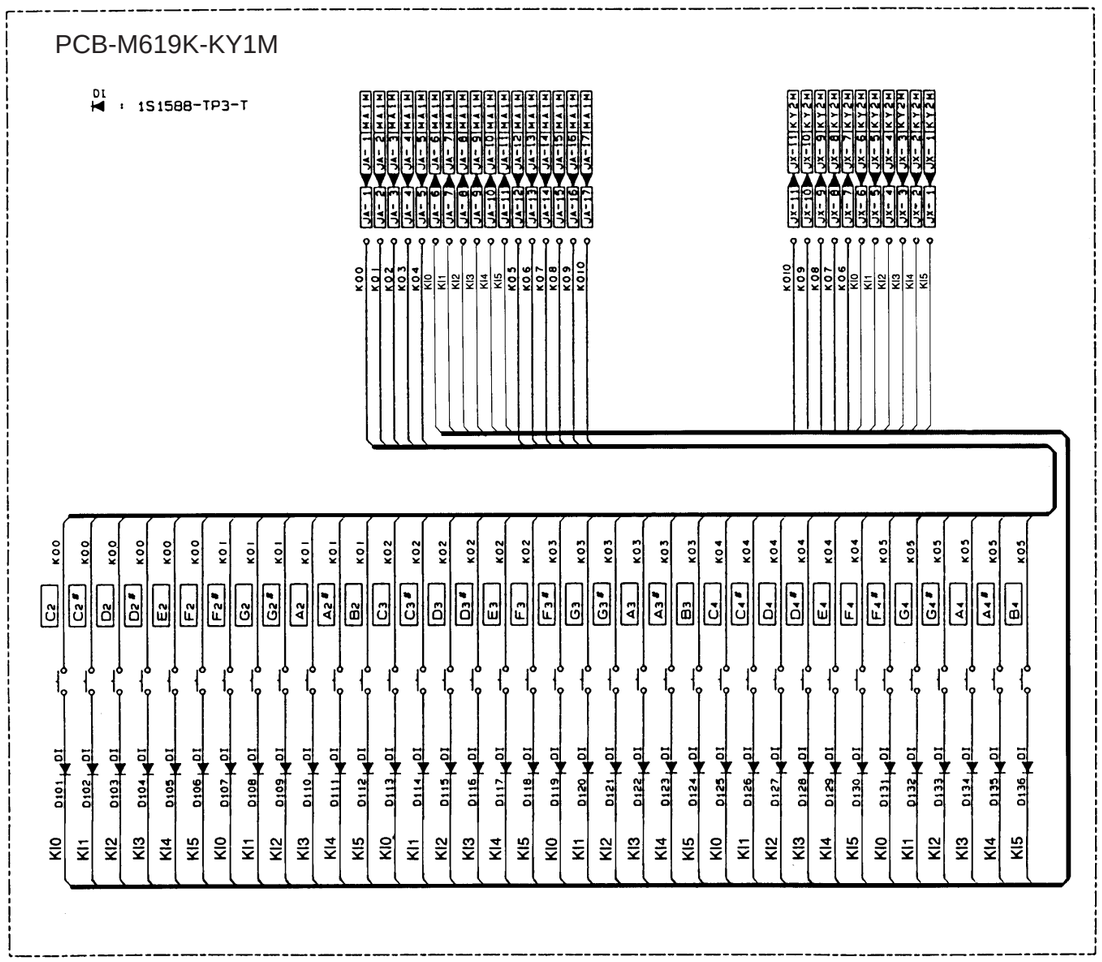
Main PCB M5505-MA1M



SCHEMATIC DIAGRAMS



Keyboard PCBs M619K-KY1M,KY2M

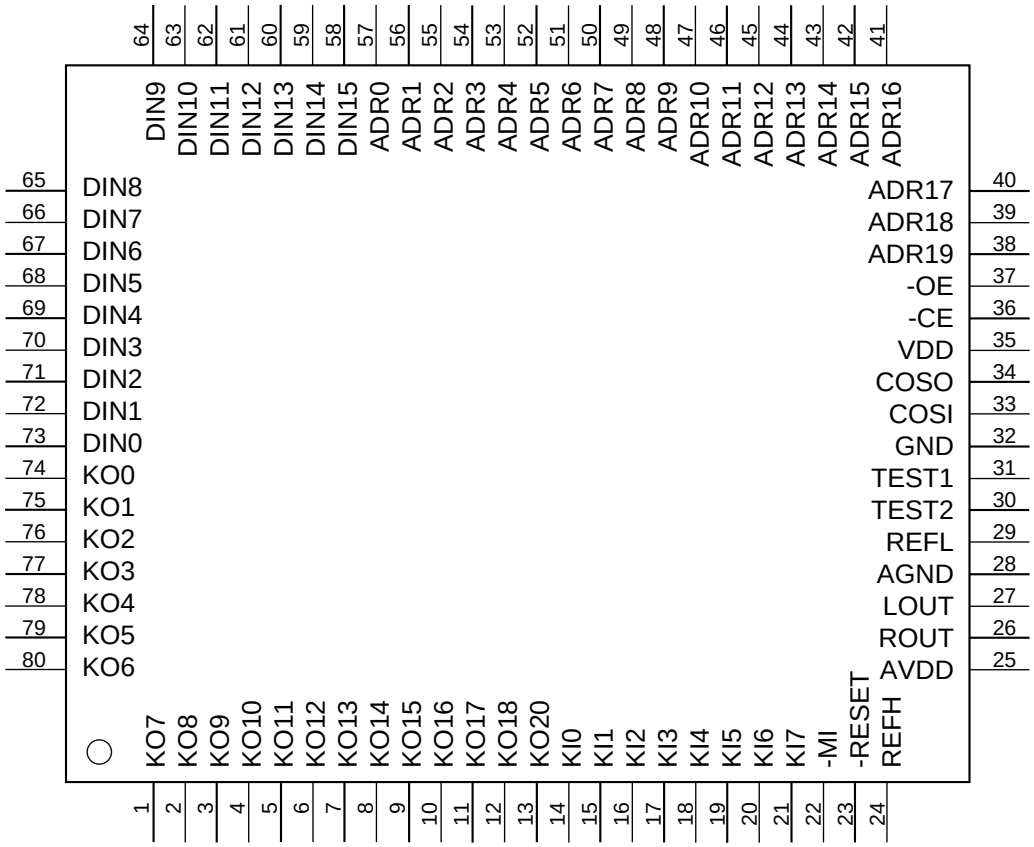


TROUBLESHOOTING

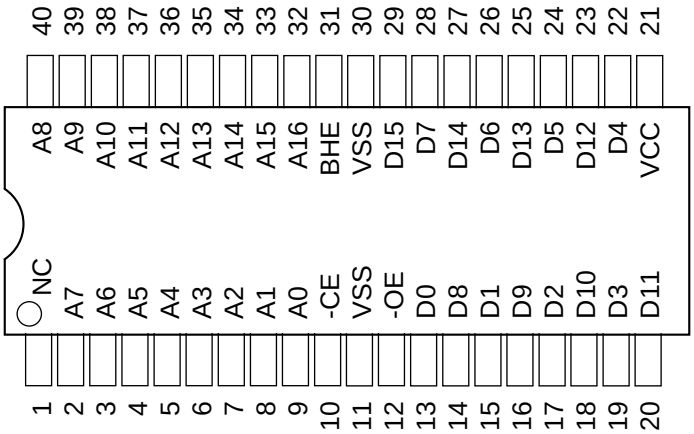
Nature of Trouble	Faulty Block	Checkpoint
No power	Power Jack (J1)	Jack contact.
	Power IC (IC1: CA5668)	Pin 8 should have +5 V.
		Pin 6 should provide + 5V when pin 10 receives + 5 V.
	Reset IC (IC4: S8053ANO)	Pin 1 should provide a low level pulse when an AC adapter is connected.
	Power Switch	Pin 22 of CPU should receive a trigger pulse when turning on the switch.
	Main Clock Generator (X1)	Check oscillation at pin 34 of CPU.
	CPU (LSI1: MSM6626-01)	Pin 12 should provide +5 V when turning on the power switch.
No sound at all	Power Amp. (IC2: LA4127)	Check output waveforms of pins 9 and 12.
	CPU (LSI1: MSM6626-01)	Check output waveforms of pins 25 and 26.
	ROM (LSI2: MN232000CUQ)	Check CE signal of pin 10, and OE signal of pin 12.
Distorted sound	ROM (LSI2: MN232000CUQ)	Check address/data bus.
	CPU (LSI1: MSM6626-01)	Check output waveforms of pins 25 and 26.
	Power Amp. (IC2: LA4127)	Check output waveforms of pins 9 and 12.
	Power IC (IC1: CA5668)	Check voltages of pins 2 (+9 V) and 6 (+5 V).
All or certain keys do not function	CPU (LSI1: MSM6626-01)	Check KO signals of pins 1 to 4, and 74 to 80.
	Key Matrix	Open circuit on KO or KI line.
A certain key does not function	Key Matrix	Dust on the contact.

IC AND TRANSISTOR LEAD IDENTIFICATION

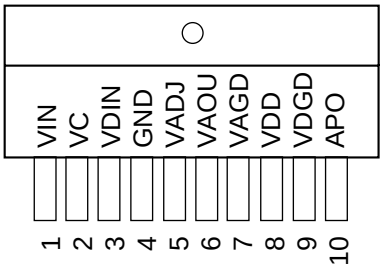
LSI1: MSM6626-01



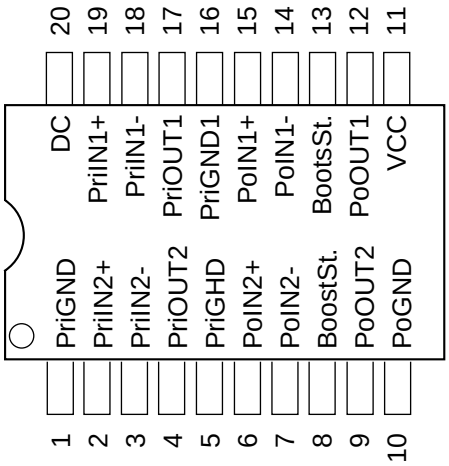
LSI2: MN232000CUQ



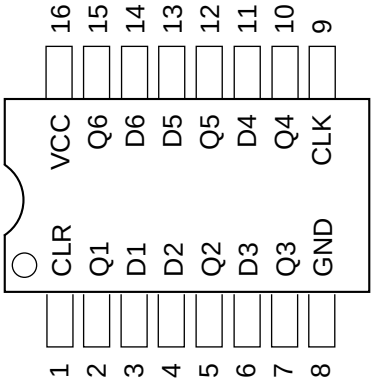
IC1: CA5668



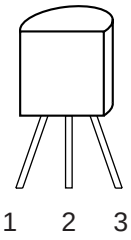
IC2: LA4127



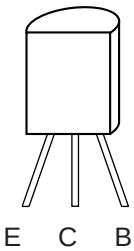
IC3: TC74HC174AP



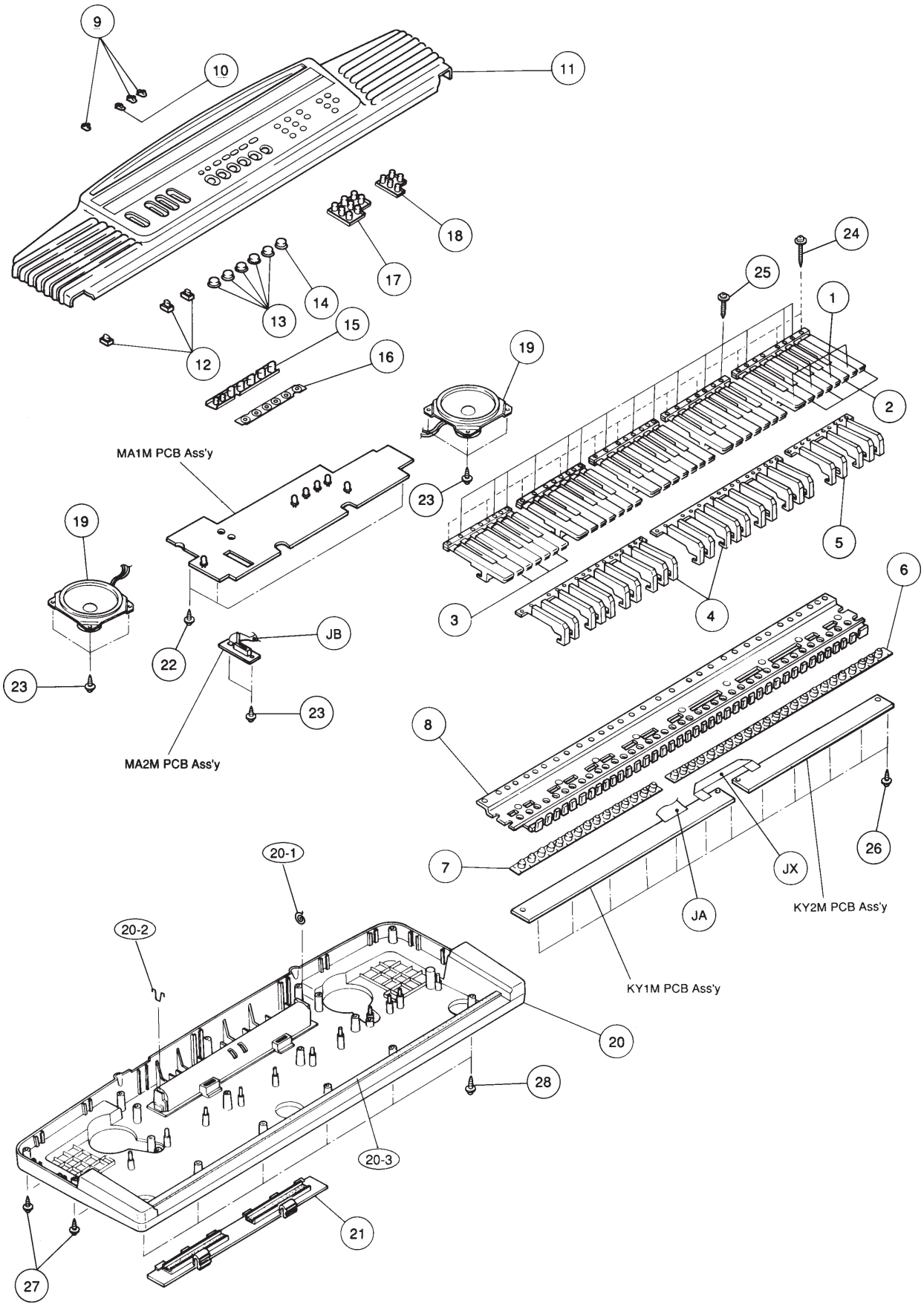
IC4: S8053ANO



T5, T6: 2SC3112B



EXPLODED VIEW



PARTS LIST

CTK-500

Notes:

1. Prices and specifications are subject to change without prior notice.
2. As for spare parts order and supply, refer to the "GUIDEBOOK for Spare parts Supply", published separately.
3. The numbers in item column correspond to the same numbers in drawing.

N	Item	Code No.	Parts Name	Specification	Q	M	FOB Japan N.R.Yen Unit Price	R	*
		PCB Ass'y M5505-MA1M							
		2011 2912	LSI	MN232000CUQ	1	1	690	A	G
		2011 4109	LSI	MSM6626-01GS-K-108	1	1	1,010	A	K
		2105 1071	IC	TC74HC174AP	1	1	70	A	B
		2105 2219	IC	S-8053ANO	1	1	60	A	B
		2114 0070	IC	LA4127	1	1	180	A	C
		2114 1239	IC	CA5668	1	1	160	A	B
		2252 0721	Transistor	2SC3113B-TPE4-T	2	10	16	A	A
		2360 1939	Zener diode	MTZJ5.1C-T77-T	1	20	12	A	A
N		2370 0987	LED	LN28RPX-(TT14)	7	20	17	C	A
		2390 0371	Diode	DSK10B-BT-T	2	20	11	B	A
		2390 1344	Diode	1SS133T-77-T	14	20	3	C	A
		2590 1190	Ceramic oscillator	EFO-GC4345C3	1	1	130	B	B
		2609 0175	Carbon film resistor	ERD-S2TJ-3R3T-T	2	20	3	C	A
		2609 0245	Carbon film resistor	ERD-S2TJ-622T-T	2	20	2	C	A
		2609 0287	Carbon film resistor	ERD-S2TJ-270T-T	2	20	2	C	A
		2616 0324	Carbon film resistor	ERD-S2TJ-100T-T	1	20	3	C	A
		2616 0332	Carbon film resistor	ERD-S2TJ-101T-T	28	20	3	C	A
		2616 0340	Carbon film resistor	ERD-S2TJ-331T-T	6	20	2	C	A
		2616 0375	Carbon film resistor	ERD-S2TJ-102T-T	4	20	3	C	A
		2616 0413	Carbon film resistor	ERD-S2TJ-472T-T	2	20	3	C	A
		2616 0430	Carbon film resistor	ERD-S2TJ-103T-T	8	20	3	C	A
		2616 0464	Carbon film resistor	ERD-S2TJ-473T-T	1	20	3	C	A
		2616 0570	Carbon film resistor	ERD-S2TJ-123T-T	1	20	2	C	A
		2616 0588	Carbon film resistor	ERD-S2TJ-471T-T	1	20	3	C	A
		2616 0634	Carbon film resistor	ERD-S2TJ104T-T	2	20	3	C	A
		2616 0677	Carbon film resistor	ERD-S2TJ-220T-T	5	20	3	C	A
		2801 7196	Electrolytic capacitor	10RE2-33-T2-T	2	20	13	C	A
		2801 7469	Electrolytic capacitor	ECE-A1CU471ZB-T	2	10	29	C	A
		2801 8176	Electrolytic capacitor	ECE-A1CU220B-T	1	10	12	C	A
		2801 8197	Electrolytic capacitor	ECE-A1AU101B-T	2	10	13	C	A
		2801 8204	Electrolytic capacitor	ECE-A1CU221B-T	1	10	22	C	A
		2801 8211	Electrolytic capacitor	ECE-A0JU101B-T	4	10	13	C	A
		2801 8449	Electrolytic capacitor	ECE-A1CU101B-T	1	10	17	C	A
		2801 9121	Electrolytic capacitor	ECE-A0JU471B-T	3	10	21	C	A
		2801 9128	Electrolytic capacitor	ECE-A0JU221B-T	4	10	17	C	A
		2801 9821	Electrolytic capacitor	ECE-A1AU220B-T	2	10	10	C	A
		2805 0526	Electrolytic capacitor	10RE2-1000	2	10	30	C	A
		2807 1023	Electrolytic capacitor	50RE2-1-T2-T	1	10	15	C	A
		2813 0245	Semiconductive capacitor	RT-C50TKYR103K-T	3	20	7	C	A
		2813 1302	Semiconductive capacitor	RT-B90TKYR104K-T	8	20	10	C	A
		2813 1393	Semiconductive capacitor	RT-C40TKYR222K-T	2	20	10	C	A
		2813 1400	Semiconductive capacitor	RT-C50TKYR562K-T	2	20	5	C	A
		2818 0365	Ceramic capacitor	RT-HE50TKYB102K-T	2	20	3	C	A
		2818 0446	Ceramic capacitor	RT-HE40TKYB101K-T	7	20	4	C	A
		2818 0494	Ceramic capacitor	RT-HE80TKSL331J-T	2	20	9	C	A
		2818 1221	Ceramic capacitor	RT-HE40TKCH050D-T	1	20	5	C	A
		2819 5460	Module capacitor	CNB5X101K	1	10	35	C	A
		2830 6229	Mylar capacitor	AMZV-104K50-T	2	10	13	C	A
		2845 0014	Module capacitor	CNB8X561M	1	5	60	C	B
		2845 0182	Module capacitor	CNB6X101K	1	5	43	C	A
		2845 0280	Ferrite beads	EXC-ELDR35C	2	20	13	C	A
		2845 2261	Three-polarity capacitor	EXC-ECT223ZVC	3	20	13	C	A
		3501 7049	DC jack	HEC2305-01-330	1	5	29	A	A
		3612 0711	Miniature jack	YKB21-5101	1	5	90	B	B

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		3719 2317	Ribbon cable M237S	DF0H02110-35358035	1	10	16	C	A
		3719 3584	Ribbon cable M505C (4-pin)	DF5H04135-MM	1	10	19	C	A
		3719 3591	Ribbon cable M505D	DF5H02290-MM	1	10	20	C	A
		3719 3598	Ribbon cable M505L	DF5H02160-35358035	1	10	20	C	A
N		3841 0959	Inductor	ELE-R100KR-T	5	10	25	C	A
		4317 3042	Blank PCB M5505-MA1M	M111131B-1	1	1	800	C	I
		2765 1211	Slide volume	EWA-MJCC20B23	1	1	110	B	B
	JB	3719 3577	Ribbon cable M505B (5-pin)	DF5H05100-MM	1	10	18	C	A
		4317 3052	Blank PCB M5505-MA2M	M111131B-2	1	10	13	C	A
		3665 0238	Pin assembly	IMSA-1068-17Z174	1	5	67	C	B
		4317 3030	Blank PCB M5505-MA3	M211408-1	1	10	11	C	A
N		6922 5200	PCB ass'y M5505-MA1M,2M,3	M111130*2	1	1	5,100	B	AA
		PCB Ass'y Keyboard							
		2305 5023	Diode	1S1588-TP3-T	61	20	8	C	A
	JX	3725 2527	PC joiner MASK61	JSF50-11-160	1	10	42	C	A
	JA	0009 2467	PC joiner M505A	JSF50-17-240M	1	5	90	C	B
		4317 2611	Blank PCB M619K-KY1M	M111074A-1	1	1	130	C	B
		4317 2620	Blank PCB M619K-KY2M	M111075-1	1	1	110	C	B
		Keyboard Ass'y							
	1	6917 4474	White key set CEGB	M110589D-1	5	1	120	A	B
	2	6917 4484	White key set DFAS	M110590D-1	1	1	110	A	B
	3	6917 4494	White key set DFA	M110591D-1	4	1	170	A	B
	4	6917 4506	Black key 10P	M110594F-1	2	1	130	A	B
	5	6918 5996	Black key 5P	M110594F-3	1	5	81	A	B
	6	6917 4453	TAC 31	M110603C-1	1	1	190	B	C
	7	6919 0410	TAC30	M110930-1	1	1	190	B	C
		6919 4330	Felt ASK-L	M411714-1	1	20	14	C	A
		6919 4340	Felt ASK-R	M411715-1	1	20	14	C	A
	8	6919 5630	KB chassis 61B-GD	M111053-1	1	1	1,340	C	O
		Case							
	9	6919 5330	Slide knob 271	M311521-1	3	20	13	B	A
	10	6919 5340	Slide volume knob 271	M311530-1	1	20	13	B	A
N	11	6922 5711	Upper case sub ass'y	M211767A*1	1	1	1,230	C	N
	12	6909 5890	SL contact12D	CSB-12D	3	10	35	B	A
	13	6921 1250	Button M505A	M311534-3	5	10	22	B	A
	14	6920 7160	Button M505A	M311534-2	1	10	22	B	A
	15	6920 7120	Button M505B	M211342-1	1	1	190	B	C
	16	6920 7151	Contact rubber M505A	M311675A-1	1	1	110	B	B
	17	6920 7130	Button M505C	M211343-1	1	1	150	B	B
	18	6920 9960	Button M505D	M211344-2	1	5	96	B	B
	19	3831 0357	Speaker	1221AF	2	1	1,000	B	K
N	20	6922 5732	Lower case sub ass'y	M211236L*17	1	1	1,210	C	M
	20-1	6902 6140	Battery spring 90 (-)	M41226-1	1	10	27	C	A
	20-2	6903 2150	Battery sparing B (+)	M41330-1	1	10	18	C	A
	20-3	6919 3190	Key damper 61	M411615-1	1	5	55	C	A
N		6922 5080	Rating plate	M311202-43	1	10	13	C	A
N	21	6906 6054	Battery cover sub ass'y	M311164D*6	1	1	210	B	C
		Screws							
	22	0009 2682	Screw	2.6 x 8	22	50	2	C	C
	23	0009 2680	Screw	4 x 8	10	50	2	C	C
	24	0009 2637	Screw	3 x 18	11	50	2	C	C
N	25	0009 2698	Screw	3 x 14	15	50	2	C	C
	26	6919 0420	Screw 3 x 8	M411481-1	12	50	2	C	C
N	27	0002 1116	Screw	4 x 8	11	50	2	C	C
	28	5111 2679	Screw	3 x 8	6	50	2	C	C

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		Accessory							
		6916 7880	Music stand	M310827-1	1		120	C	B

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CASIO COMPUTER CO.,LTD.
Service Division

8-11-10, Nishi-Shinjuku
Shinjuku-ku, Tokyo 160, Japan
Telephone: 03-3347-4926

MA0300941A